these stars produce more or less energy than the SS Cygni stars. Perhaps it is not so much that the flare is associated with the occurrence of strong emission of hydrogen and ionized calcium, but rather that the emission lines are caused by gasses left around the chromosphere of the star as a result of frequent flares.

The available Yerkes plates—four taken during morning parallax epochs and four taken during evening epochs—have been measured for the parallax. It had been hoped that the much larger scale of these plates—more than four times that of the Tucson plates—would yield a much more accurate value of the parallax. In spite of their large scale, however, the images of the two components are reasonably well separated in only four exposures out of a total of 24. Consequently the plates are much more difficult to measure than those taken at Tucson, where the images are only slightly elongated, and the resulting accuracy is not as high as had been hoped. The two flare exposures show very queer images and therefore have not been used for parallax measurement. The provisional value of the parallax derived from these measures is $0''.41 \pm 0''.04$, considerably smaller than the original value of $0''.56 \pm 0''.06$.

THE INFRARED SPECTRA OF THE PLANETARY NEBULAE BD+30°3639, NGC 6572, AND NGC 6543

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A description of the infrared spectrum of a planetary nebula is available only for NGC 7027.[1] Spectrograms on hypersensitized 1-N emulsion have been obtained in the region λ 6500 to λ 8700 for BD+30°3639, NGC 6572, and NGC 6543, using a fast grating spectrograph at the prime focus of the McDonald reflector. The dispersion varies from 380 A/mm at λ 6500 to 310 A/mm at λ 8500. These three objects are of rather low excitation; none of them shows the [*A* V] line at λ 7006.

In BD+30°3639, which has the lowest excitation, the strongest lines, besides $H\alpha$, are due to [*N* II] (^3P–^1D), [*O* II]

[1] W. H. Wright, *Pub. A.S.P.*, **32**, 64, 1920; P. W. Merrill, *ibid.*, **40**, 254, 1928; L. H. Aller and R. Minkowski, *ibid.*, **58**, 258, 1946.

($^2D^\circ$–$^2P^\circ$) and [*S* II] ($^4S^\circ$–$^2D^\circ$). NGC 6572, which has a higher excitation, shows [*A* III] ($^3P_2$–$^1D_2$) much stronger than [*S* II], and a little stronger than [*O* II]. In NGC 6543, [*A* III] is much stronger than [*S* II] and [*O* II]. The [*N* II] and [*S* II] lines have low transition probabilities (order of 0.002) and low excitation potentials (about 1.8 v). [*A* III] has high transition probabilities (0.32 and 0.085), and a low excitation potential (1.73 v). [*O* II] has high transition probabilities (0.36 and 0.31) and a high excitation potential (5.0 v). An examination of these forbidden lines in peculiar bright line stars would provide interesting information. No line other than those found in NGC 7027 appears except λ 8446 *O* I in NGC 6572.

A comparison of the estimated line intensities in these three nebulae and in NGC 7027[2] is given in Table I.

TABLE I

INFRARED SPECTRA OF BD+30°3639, NGC 6572, NGC 6543, AND NGC 7027

Wave Length	Identification	Intensities BD+30°3639	NGC 6572	NGC 6543	NGC 7027
6548	[*N* II]	20	15	2	Not given
6563	*H*α	30	50	20	Not given
6584	[*N* II]	50	30	6	Not given
6678	*He* I	—	6	3	1.3
6717	[*S* II]	5	3	1	(1.3)
6731	[*S* II]	7	4	1	2.4
7006	[*A* V]	No trace	No trace	No trace	1.5
7065	*He* I	—	10	4	2.6
7136	[*A* III]	2	12	6	6.1
7169	[*A* IV]	—	1	1	Not given
7236	[*A* IV]	—	0	1	0.4
7263	[*A* IV]	0?	1	1	0.9
7319	[*O* II]	10	10	1	7.7
7330	[*O* II]	10	10	1	
7378	*C* IV	—	0	—	0.5
7751	[*A* III]	1	8	5	2.2
8237	*He* II	—	—	1	0.4
8446	*O* I	—	1	—	—
8545	P_{15}	—	0–1	—	0.07
8598	P_{14}	—	1	1–0	0.2
8665	P_{13}	—	1	1–0	0.3

[2] Aller and Minkowski, *loc. cit.*